

Appl. No. 09/828,660
Response to Final Action of July 30, 2003

AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior versions, and listings, of claims in the application.

Listing of Claims:

2/19/04
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Claim 38 (currently amended) A tool comprising a cutting edge that extends from a tip end to a root end, the cutting edge having a controlled hone formed on it which defines a dimension ~~has a shape~~ at the tip end different from a corresponding dimension defined the shape at the root end, at least a substantial portion of the controlled hone defining a surface continuously curved in cross section.

Claim 39 (currently amended) A tool according to claim 38 wherein the hone shape dimension varies continuously along the cutting edge from the tip end to the root end.

Claim 40 (original) A tool according to claim 38 wherein the tool is a threading tool and wherein the cutting edge is a thread forming edge.

Claim 41 (original) A tool having a cutting edge with a hone thereon that varies from a tip end to a root end, the hone being formed in accordance with a process comprising the steps of:

placing the tool in a fixture;

rotating an abrasive brush about a rotational axis, the abrasive brush including a plurality of abrasive bristles which define a volume;

adjusting the position of the cutting edge relative to the axis of rotation of the abrasive brush such that at least a portion of the cutting edge to be honed is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed;

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01 translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that a portion of the cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the cutting edge having a first shape;

adjusting the position of the cutting edge relative to the axis of rotation of the abrasive brush such that another portion of the cutting edge is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed; and

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that said other portion of the cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the cutting edge having a second shape different from the first shape.

Claim 42 (original) A tool having a cutting edge with a hone thereon that varies from a tip end to a root end, the hone being formed in accordance with a process comprising the steps of:

positioning the cutting edge relative to an abrasive brush rotating about an axis of rotation, the abrasive brush having a plurality of abrasive bristles;

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that a portion of the cutting edge passes through at least a portion of the abrasive bristles to form a hone on the cutting edge having a first shape; and

repositioning the cutting edge while translating the tool through the abrasive bristles such that a second portion of the cutting edge is substantially parallel to the axis of rotation of the abrasive brush, the repositioning causing a hone having a shape different from the first shape to be formed on the second portion of the cutting edge being honed.

Claim 43 (currently amended) A tool comprising a cutting edge that extends from a first end to a second end and has an intermediate portion between the first and second ends, the cutting edge having a controlled hone formed on it that ~~has a shape and dimensions variable~~ defines at least one dimension that varies along the intermediate portion of the cutting edge from the first end to the second end, at least a substantial portion of the controlled hone defining a surface continuously curved in cross section.

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Claim 44 (currently amended) A tool as in claim 43, wherein the shape at least one dimension varies continuously from the first end to the second end.

Claim 45-47 (canceled).

Claim 48 (currently amended) A tool as in claim 43, wherein the shape at least one dimension at the first end is different from the shape corresponding dimension at the second end.

Claim 49 (previously presented) A tool as in claim 43, wherein the shape at least one dimension at the first end is the same as the shape corresponding dimension at the second end, and the shape at least one dimension along the intermediate portion is different from the shape corresponding dimension at the first and second ends.

Claim 50 (previously presented) A tool comprising a cutting edge that extends from a first end to a second end and has an intermediate portion between the first end and the second end, the cutting edge having a controlled hone formed on it, the hone having a first shape and ~~first dimensions~~ at the first end, a second shape and ~~second dimensions~~ at the second end, and an intermediate shape and ~~intermediate dimensions~~ along the intermediate portion, at least a substantial portion of the controlled hone defining a surface continuously curved in cross section.

Claim 51 (previously presented) A tool as in claim 50, wherein the first shape and the second shape are substantially the same.

Claim 52 (previously presented) A tool as in claim 50, wherein the first shape and the second shape are substantially the same and the intermediate shape is variable between the first end and the second end.

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Claim 53 (previously presented) A tool as in claim 52, wherein the intermediate shape varies continuously from the first end to the second end.

Claim 54 (previously presented) A tool as in claim 50, wherein the first shape, the second shape, and the intermediate shape are all substantially the same.

Claims 55-58 (canceled)

Claim 59 (previously presented) A high precision cutting tool comprising a plurality of cutting edges formed on a portion of the tool, each cutting edge having a controlled hone formed on it; the magnitude of the hone on one edge being different than the magnitude of the hone on at least one other edge, at least a substantial portion of the controlled hone defining a surface continuously curved in cross section.

Claim 60 (previously presented) A high precision cutting tool according to claim 59 wherein the magnitude of the hones on adjacent edges are different.

Claim 61 (previously presented) A high precision cutting tool according to claim 59 wherein the magnitude of the hone on an edge varies along at least a portion of the edge.

Claim 62 (previously presented) A high precision cutting tool according to claim 59 wherein the shape of the hone is non-symmetrical on at least one edge.

Claim 63 (previously presented) A high precision cutting tool according to claim 59 wherein the shape of the hone on one edge is different from the shape of the hone on at least one other edge.

Claim 64 (previously presented) A high precision cutting tool comprising a plurality of cutting edges formed on a portion of the tool, each cutting edge having a controlled hone formed on it; the magnitude of the hone on one edge being different

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than the magnitude of the hone on at least one other edge, the hone being formed in accordance with a process comprising the steps of:

placing the tool in a fixture;

rotating an abrasive brush about a rotational axis, the abrasive brush including a plurality of abrasive bristles which define a volume;

adjusting the position of the cutting tool relative to the axis of rotation of the abrasive brush such that at least a portion of a first cutting edge to be honed is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed;

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that a portion of the first cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the first cutting edge having a first shape;

adjusting the position of the cutting tool relative to the axis of rotation of the abrasive brush such that a second cutting edge is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed; and

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that the second cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the second cutting edge having a second shape different from the first shape.

65 (new) A tool having a cutting edge with a hone thereon that varies from a tip end to a root end, the hone being formed in accordance with a process comprising the steps of:

placing the tool in a fixture;

rotating an abrasive brush about a rotational axis, the abrasive brush including a plurality of abrasive bristles which define a volume;

adjusting the position of the cutting edge relative to the axis of rotation of the abrasive brush such that at least a portion of the cutting edge to be honed is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed;

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that a first portion of the cutting edge passes through at least a portion of the

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volume of the abrasive brush to form a hone on the first portion of the cutting edge, the hone on the first portion defining a dimension;

01 adjusting the position of the cutting edge relative to the axis of rotation of the abrasive brush such that a second portion of the cutting edge is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed; and

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that the second portion of the cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the second portion of the cutting edge, the hone on the second portion defining a dimension corresponding to the dimension defined by the first portion that is different from the first portion dimension.

Claim 66 (new) A tool having a cutting edge with a hone thereon that varies from a tip end to a root end, the hone being formed in accordance with a process comprising the steps of:

positioning the cutting edge relative to an abrasive brush rotating about an axis of rotation, the abrasive brush having a plurality of abrasive bristles;

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that a first portion of the cutting edge passes through at least a portion of the abrasive bristles to form a hone on the cutting edge defining a dimension; and

repositioning the cutting edge while translating the tool through the abrasive bristles such that a second portion of the cutting edge is substantially parallel to the axis of rotation of the abrasive brush, the repositioning causing a hone to be formed on the second portion of the cutting edge, the hone on the second portion defining a dimension corresponding to the dimension defined by the first portion that is different from the first portion dimension.

Claim 67 (new) A high precision cutting tool comprising

a plurality of cutting edges formed on a portion of the tool, each cutting edge having a controlled hone formed on it defining a dimension; the dimension defined by the hone on one edge being different than a corresponding dimension defined by at least one other edge, the hones being formed in accordance with a process comprising the steps of:

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placing the tool in a fixture;

rotating an abrasive brush about a rotational axis, the abrasive brush including a plurality of abrasive bristles which define a volume;

adjusting the position of the cutting tool relative to the axis of rotation of the abrasive brush such that at least a portion of a first cutting edge to be honed is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed;

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that a portion of the first cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the first cutting edge;

adjusting the position of the cutting tool relative to the axis of rotation of the abrasive brush such that a second cutting edge is substantially parallel to the axis of rotation of the abrasive brush and in a desired position to be honed; and

translating the tool along a path substantially parallel to the axis of rotation of the abrasive brush such that the second cutting edge passes through at least a portion of the volume of the abrasive brush to form a hone on the second cutting edge.